



The Conservation Strip

CONSERVING NATURAL RESOURCES FOR A BETTER ENVIRONMENT

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Septic Systems and Pollution

Many streams throughout Virginia, including several in Fauquier County, are listed as 'impaired' for various reasons. Impaired streams may be polluted by sediment, nutrients, or pathogens, which are the three leading causes for making the list. Other causes include low oxygen levels, habitat alterations, pH, metals, mercury, and pesticides.

Most of Fauquier's impaired streams made the list because of high levels of fecal coliform bacteria. Fecal coliforms are generally harmless, but they are used as an indicator that pathogens may be present. Fecal coliform bacteria live in the intestines of warm blooded animals, and their presence in water indicates pollution by fecal matter.

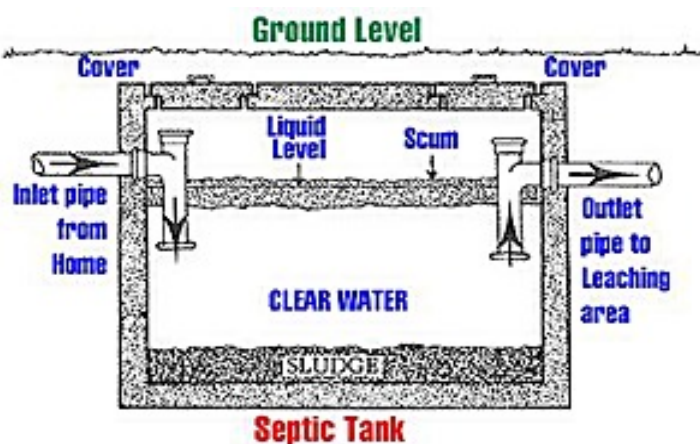
It is relatively easy to test water for fecal coliform bacteria. It is another matter to determine the source of the bacteria, especially in a watershed that receives runoff from a large area. Bacterial Source Tracking, or BST, involves a number of rather complex methods used to determine bacterial sources.

Humans, pets, livestock, and wildlife all contribute to fecal coliform pollution and all four have been identified in Fauquier's impaired streams. Pollution caused by wildlife can be very difficult to deal with, however, there are steps that can be implemented to deal with the other three sources. Many farmers have already fenced streams, planted riparian buffers, and installed alternate water sources for their animals to protect water quality. Cost share money is still available to help qualifying landowners install Best Management Practices. Most suburban and urban areas have ordinances requiring pet owners to clean up after their animals.

In rural counties, human sources of fecal coliform are

likely to come from malfunctioning septic systems. Since septic systems are under ground, for most people, they are out of sight and out of mind. Homeowners will generally assume their system is working properly as long as sewage does not back up into the house, or come to the surface of the yard over the drain field. Septic tanks and drain fields can be very expensive to repair or replace, so preventive maintenance is well worth the cost.

The general recommendation is to have a septic tank pumped every 3-5 years. The cost to pump a tank may run from \$150 to \$300. The cost will vary on how long it takes to find the septic tank, how deep it is buried, and how much effluent will be pumped out. It is always a good idea to know exactly where the septic tank is located, and to keep records of all maintenance.



In a properly functioning system, wastewater enters the septic tank and separates into layers to start the decomposition process. Bacteria, which are naturally present, digest the solids, transforming about 50% of these materials into gas and liquid. When the liquids

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Department of Forestry Tree Seedlings

Growing Your Own Seedlings

The JMSWCD will not conduct a tree seedling sale this year, however, landowners who want trees can still order them through the **Virginia Department of Forestry**. The VDOF offers 45 species of seedlings that are all Virginia grown.

The VDOF has been in the seedling business for 89 years. They grow over 35 million seedlings annually on 400 acres at two locations.



In addition to the popular pines and oaks, several other species of conifers and hardwoods are available. Also available are specialty packs for riparian buffers, windbreaks, fall color, and wildlife. Several seed mixtures are available for game birds, general wildlife, erosion control, and wildflowers.

Most tree seedlings are sold in bundles of 50, 100, 250, 500, and 1,000. Seedlings are shipped bareroot and

may vary in size from six to twenty-four inches depending on age and species. Orders are shipped in March and April from the Augusta Forestry Center by UPS directly to the purchasers doorstep.

There are several ways to place an order. A seedling catalog with order forms is available from the local Forestry Department located on Frost Avenue in Warrenton. The phone number is 540-347-6358. Orders can also be made by phone directly to the Augusta Forestry Center at 540-363-7000. Orders can also be made online through the Virginia Department of Forestry website at <http://www.dof.virginia.gov>. Select *Tree Seedlings* from the right hand column.

The idea of growing oak, hickory, dogwood, or pine trees from seed is appealing to some people, and can be a fun and challenging project. Although the prime time to collect seeds is past, some trees and shrubs are still hanging on to their seeds, and some are still lying on the ground in good shape.

Most nuts, fruits, or berries produced in the fall require exposure to a period of cool, moist conditions before they will germinate. Under natural conditions, this need is met when the seeds drop to the ground and spend the winter lying on the forest floor. When spring weather comes along, they will germinate. Many types of seed gathered right now and planted in containers and placed on a sunny windowsill will fail to germinate because they have not experienced enough cold weather.

There are two methods to help seeds meet this requirement for cold weather. One method is to collect seeds and plant them outdoors in the fall. They can be planted in prepared beds, or in containers. The other method is to collect seeds in the fall and store them under cool, moist conditions, then plant them in the spring. This is known as stratification, and is easy to do at home. Collect seeds such as acorns or hickory nuts, and store them in plastic bags with slightly damp sand or peat in the refrigerator.

Some types of seeds require as little as 30 days of stratification to germinate, others may need as much as 120. This is where reference books become necessary, and there are numerous plant propagation books and websites that provide the needed details.

Reference books will also detail the exceptions and nuances of some seeds. For example, the acorns of red oak will not germinate until spring, but acorns of white oak will send out a root in the fall, and the leaves next spring. Viburnums require double dormancy, and will not germinate until the second season after planting, while seeds with impermeable seed coats, such as redbud, may require some sort of treatment to soften or crack (scarify) the seed coat.

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rise to the level of the outflow pipe, they enter the drainage system and receive final treatment after percolating through the drainage pipes into the soil. In a properly operating system, the soil absorbs and filters the effluent and soil microbes break down the rest of the waste within inches of the drainage pipes.

Seepage from a malfunctioning septic system can contaminate both surface and groundwater with pathogens and nutrients. There is a potential health hazard if pathogens reach drinking water supplies, and nutrients can contribute to algae and weed problems in streams and ponds.

There are several steps that homeowners can take to prolong the life of a septic system. The first and most obvious is to have it pumped on a regular schedule. Most licensed septic pumpers can also inspect the system to make sure it is working properly.

It also helps to minimize the amount of water entering the system. This can be accomplished by installing low-flow toilets and shower heads, repairing leaks, and making sure sump pumps and roof drains are not tied into the sewage system. Hazardous chemicals poured down a drain might affect the bacteria in the septic tank, and materials like grease, cloth, and plastic may clog drain pipes. Most experts also recommend against the use of garbage disposals with septic systems, and they also see no advantage to using septic tank additives which are widely advertised.

In addition to protecting the septic tank, it is also important to remember to protect the drain field. Never park cars or heavy vehicles on a drain field, as they will compact the soil and reduce its ability to treat wastewater. Driving over the field can also directly damage the drain pipes. Roof gutters and sump pumps should not drain over the field. They may keep the soil too wet and reduce its capacity to treat waste. Also, avoid planting water loving trees and shrubs over the drain field, as their roots may clog the pipes; and do not build raised beds or conduct other gardening practices that will change the soil level or contour. For more information on planting around a drain field, see the article in the next column. For more information on septic systems visit the Virginia Department of Health website at <http://www.vdh.state.va.us>.

Planting On A Septic Field

For many homeowners in suburban and rural areas of Fauquier County, the location of a septic drain field in the front or back yard can create a landscaping dilemma. Quite often, the area taken up by the drain field may also be the best place to plant a vegetable garden, flower garden, or a few shade trees. The challenge of gardening around a drain field is to select plants that will meet the landscape needs and not clog the drain pipes. Unfortunately, there are no hard and fast rules for planting around drain fields. The following guidelines are from 'Planting on Your Septic Drain Field' a Virginia Tech Environmental Horticulture bulletin prepared by Susan Day and Ellen Silva.

A typical drain field has drainage pipes on nine foot centers. They are placed in trenches three feet wide, so there should be six feet of undisturbed soil between the lines. However, most homeowners do not know exactly where the drain lines are, and this just complicates matters.

Most septic fields are covered by grass, which helps the drain field function by removing water and nutrients from the soil. In addition to grass, shallow rooted perennials, annuals, and many ground covers are good choices that are unlikely to clog drain lines. It is preferable to locate vegetables away from the drain field, but if that is the only location with enough sun, the following precautions are suggested. Do not plant root crops directly over drain lines, and use mulches to keep soil from splashing up onto the foliage of leafy green vegetables. Train fruiting crops like tomatoes and cucumbers off the ground, do not build raised beds or mounds that may affect drainage, and thoroughly wash all produce from the garden.

Planting trees and shrubs is more risky. Some trees, like beeches, birches, elms, maples, and willows are notorious for clogging lines. Oaks and pines have less intrusive root systems, but should still be planted some distance away. A general rule is to plant a tree at least as far away from the drain line as the mature height of the tree. For example, a tree that will reach 25 feet in height should be at least 25 feet from the lines. Some roots will eventually reach the drain field, but should not cause problems. If the exact location of the drain lines are known, shrubs and small trees like dogwoods, crabapples, and flowering cherries can be located between the lines. In the end, it is the homeowner's decision to decide how much risk to take and plant accordingly.

A New Method of Testing for E. coli in Water

Testing kits are affordable and readily available for nitrogen, phosphorus, dissolved oxygen, and numerous other chemicals that may be found in water. However, sampling for bacteria usually involves collecting a sample and delivering it in person to a specialized testing lab which will charge \$25-40. Because of the cost involved, most citizen and school groups that monitor streams and ponds in Virginia do very little if any bacterial testing.



John Holmes collects water sample from Thumb Run.

This is starting to change with the introduction of the Coliscan Easygel method which has been introduced around the country over the last few years. The Easygel method is a patented process that uses a special medium to grow coliform bacteria in pre-treated petri dishes. The medium contains inhibitors that block the growth of most non-coliform bacteria, and special dyes that turn coliform bacteria pink and *Escherichia coli* (*E. coli*) purple.

This method is proving very useful to monitoring groups, because *E. coli* is now being used as the standard for bacterial testing. Many streams in

Virginia are listed as 'impaired' because of fecal coliform. High levels of fecal coliform bacteria indicate pollution from fecal matter that may come from humans, pets, livestock, and wildlife. While fecal coliforms are generally harmless, they are used as an indicator that harmful pathogens may be present. It is cheaper and safer to test for fecal coliforms than individual pathogens.

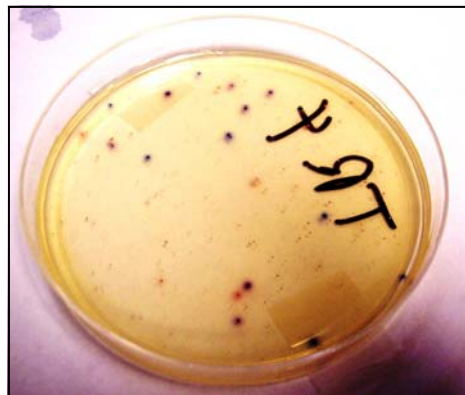
Coliform bacteria are a large group of related bacteria that live in a variety of niches. Some are normally found in soil and water. Those that routinely live in the digestive tracts of warm blooded animals are called fecal coliforms because they are present in high levels in animal feces. *E. coli* is one type of fecal coliform bacteria. There are many strains of *E. coli*, and the strains found in water are generally harmless and should not be confused with the strain found occasionally in undercooked ground beef that can cause serious illness.

The Virginia Department of Environmental Quality is using the Easygel method with several citizen monitoring groups around the State. The groups are monitoring designated streams on a monthly basis and sending results to DEQ. The John Marshall SWCD is monitoring ten stations on Thumb Run as part of this project. Since the method is still relatively new and used primarily by volunteer groups, DEQ will review the data and conduct follow-up tests using traditional methods. A few states have already adopted Easygel for official testing.

The testing procedure involves collecting water samples in sterile vials. A small amount of the sample is transferred with a pipette to another vial containing the medium, which is then poured into the petri dish. At room temperature, the bacteria will grow and be visible in 36-48 hours. In an incubator set at 90-95F, the bacteria will be visible in 18-24 hours. With a little practice, it is an easy matter to count the purple colonies which indicate the presence of *E. coli*.

Since *E. coli* are so widespread, it is normal to have low levels in most surface waters. DEQ uses a limit of 235 *E. coli* colonies per 100 ml sample for streams that are monitored monthly. To make the 'impaired list', a stream must have more than 10.5% of samples over an assessment cycle exceed the standard. An assessment cycle may last as long as five years so bias caused by drought or extreme weather conditions will be removed.

Coliscan Easygel kits are available from several scientific supply companies. They are often packaged in kits with ten sample bottles, ten vials of medium, ten pipettes, ten petri dishes, and instructions. The cost per test



Bacterial colonies are easy to count in 24-48 hours, depending on temperature.

will average a little over \$2, making it affordable for monitoring groups, classroom use, and science fair projects. Some teachers are already incorporating the Easygel process as a learning tool with biology and environmental classes.

Trash Pick-up Good and Bad

On October 4, the John Marshall SWCD participated in the annual International Coastal Cleanup sponsored by Clean Virginia Waterways and the Ocean Conservancy. The staff members picked up litter and trash along Rt. 802 (Springs Road) where it crosses the Rappahannock River. The good news is that they picked up well over 600 pounds of trash. The bad news is that they picked up almost exactly the same amount last year at the same location, indicating that local litterbugs have been hard at work. Among the items collected were 198 plastic bottles, 163 glass bottles, 97 cans, 248 food wrappers, 138 plastic cups and forks, and over 300 cigarette filters and tobacco wrappers, and 10 tires. All trash was taken to the Fauquier County Landfill.



The John Marshall SWCD staff and truckload of trash collected along Rt. 802 where it crosses the Rappahannock.

Conservation Field Days

The John Marshall SWCD hosted almost 1000 students, teachers, and chaperones at four different farms during September and October. On September 15, third grade



Taylor students learn about milking from Jimmy Messick.

students from M.M. Pierce and H.M. Pearson visited Inglewood Farm in Bealeton, while students from Bradley and Coleman visited Blue Ridge Farm in Upperville. On September 16, students from Grace Miller and Mary Walter visited Inglewood, while students from P.B. Smith, and Brumfield visited Elk Mount Farm in Midland. Seventh Grade students from Taylor Middle School visited Messick's Dairy Farm in Midland on October 27. At each of the farms, students rotated through a series of educational stations. Stations were staffed by personnel from the local farms, Extension, DEQ, Forestry, Community Development, the Master Gardeners, local Soil and Water Conservation Districts, and Joiner Micro-Labs.

The Conservation Strip is a quarterly publication of the **JOHN MARSHALL SOIL AND WATER CONSERVATION DISTRICT**, 98 Alexandria Pike, Suite 31, Warrenton, VA 20186

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Small Farm Initiative

A new initiative to help small scale farmers take better care of their natural resources was announced at the Small Farm Conference held at Virginia State University on November 9&10. Small scale farmers can sign up until January 13, 2006 for cost sharing of conservation practices to reduce erosion, protect water quality, and improve grazing land and forest land management.

In Virginia, the average farm size is 181 acres. Under the Small Scale Farm Initiative, anything less than 181 acres would be categorized as a small farm. This number represents almost three-fourths of the farms in the state.

Certain criteria must be met for farmers who want to participate. Farmers with less than 181 total acres of farmland, including 100 acres or less of cropland or pastureland may apply. To be eligible, the farmer must have less than \$50,000 total household income, and have at least 10% of the open land in an alternative crop or livestock.

For more information contact the local Natural Resource Conservation Office at 540-347-3120.

New EQIP Practice

The USDA's Environmental Quality Incentives Program (EQIP) has a new practice this year for Virginia's farmers that grow row crops. It is called the 'Conservation Crop Rotation'.

The practice is intended to help farmers establish perennial forage into their crop rotation on their cropland, and will pay them a flat rate of \$100/acre per year for up to three years. The perennial forage may be grazed, cut for hay, or chopped for silage. Farmers who have a continuous corn silage-rye silage rotation or who are using any type of tillage in their crop rotations may be interested in this practice.

The purpose of this practice is to improve soil quality by increasing soil organic matter by using perennials such as orchardgrass, timothy, and/or alfalfa. Interested farmers should contact their local NRCS office at 540-347-3120 and ask to sign up for EQIP for the Conservation Crop Rotation Practice.

The deadline for sign up for this program is January 13, 2006.

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